

# HP StorageWorks Replication Solutions Manager installation and administrator guide

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HP StorageWorks Replication Solutions Manager installation and administrator guide

# Contents

<b>Preface . . . . .</b>	<b>7</b>
About this guide . . . . .	7
Intended audience . . . . .	7
Prerequisites . . . . .	7
Related documentation . . . . .	7
Document conventions . . . . .	8
HP technical support . . . . .	8
HP-authorized reseller . . . . .	9
HP storage web site . . . . .	9
Helpful web sites . . . . .	9
Providing feedback . . . . .	9
<b>1 Installing the software . . . . .</b>	<b>11</b>
Requirements . . . . .	11
Installation best practices . . . . .	12
Installation scenarios . . . . .	12
Storage Area Manager management server . . . . .	12
Existing Storage Area Manager host agent with unsupported Storage Area Manager host agents . . . . .	12
Existing management server with unsupported Storage Area Manager host agents . . . . .	12
SMA . . . . .	13
SMA with Storage Area Manager . . . . .	13
Acquiring manually installed host agents via Storage Area Manager . . . . .	13
Executable file names . . . . .	13
Installing the server software . . . . .	13
Installing host agent software . . . . .	14
Remote deployment . . . . .	14
Local installation . . . . .	14
Upgrading the replication software . . . . .	15
Software verification . . . . .	15
Registry verification for Windows . . . . .	16
<b>2 Configuring the software . . . . .</b>	<b>19</b>
Starting the software . . . . .	17
From the software icon (application mode) . . . . .	17
From an authorized client (applet mode) . . . . .	18
Browsing directly to the software . . . . .	18
Browsing to the software through the SMA . . . . .	19
Configuring the software . . . . .	19
Changing the password . . . . .	19
Adding remote access IP addresses . . . . .	20
IP addresses on UNIX systems . . . . .	20
Installing the JREserver . . . . .	21
Configuring Windows systems with multiple NICs . . . . .	21
Adding device files on Linux hosts . . . . .	21
<b>3 Replication management . . . . .</b>	<b>23</b>
Concepts . . . . .	23

Snapclone . . . . .	23
Snapshot . . . . .	23
DR groups . . . . .	23
Managed sets . . . . .	23
Replication manager logs . . . . .	24
About the software . . . . .	24
Monitoring events . . . . .	25
About the CAUI and RSM databases . . . . .	25
Accessing the database . . . . .	26
Migrating data from HP Continuous Access EVA User Interface . . . . .	26
Changing the password for the management server . . . . .	27
Importing user accounts and group data . . . . .	28
Automatic discovery and database refresh . . . . .	28
Manual discovery and database refresh . . . . .	29
Cleaning up the database . . . . .	29
Jobs . . . . .	29
Command line user interface . . . . .	30
<b>4 Best practices . . . . .</b>	<b>31</b>
Backing up replication jobs and configurations . . . . .	31
Avoiding job failure . . . . .	31
Optimizing performance . . . . .	32
Using log files for troubleshooting jobs . . . . .	32
Managing replication events . . . . .	32
Minimizing simultaneous replication events on an array . . . . .	32
Avoiding simultaneous replication events for the same virtual disk . . . . .	32
Job scheduling . . . . .	32
Complying with EVA snapshot rules . . . . .	32
Complying with EVA snapclone rules . . . . .	33
Caching in Microsoft Windows . . . . .	33
Asynchronous replication with failsafe enabled . . . . .	34
Using Mozilla to browse to the replication management server . . . . .	34
<b>5 Using Storage Area Manager to deploy host agents . . . . .</b>	<b>35</b>
Overview . . . . .	35
Deploying a software host agent . . . . .	35
Upgrading Storage Area Manager . . . . .	37
Removing deployed software host agents . . . . .	37
<b>6 Removing the software . . . . .</b>	<b>39</b>
Overview . . . . .	39
Removing the server software . . . . .	39
Requirements . . . . .	39
Procedure . . . . .	39
Removing host agent software . . . . .	40
Requirements . . . . .	40
Procedure . . . . .	40
<b>7 Troubleshooting . . . . .</b>	<b>41</b>
<b>Glossary . . . . .</b>	<b>45</b>
<b>Index . . . . .</b>	<b>47</b>

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# Figures

1 The software interface example . . . . .	18
2 Properties window . . . . .	27
3 Import User Accounts window . . . . .	28
4 Installing or modifying Storage Area Manager packages . . . . .	36

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# Tables

1 Document conventions . . . . .	8
2 Remaining Host Agent directories . . . . .	38

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# Preface

## About this guide

This guide describes procedures for installing, configuring, and managing HP StorageWorks Replication Solutions Manager (hereafter called the software).

Topics include:

- Preparing for installation
- Installing the software
- Configuring the software
- Removing the software
- Troubleshooting the installation
- Replication management tasks

## Intended audience

This guide is intended for network and storage administrators and HP-authorized service providers who are installing, configuring, or maintaining the software.

## Prerequisites

Using this guide requires basic knowledge of:

- Storage Area Networks (SANs)
- SAN fabrics
- HP StorageWorks Enterprise Virtual Array
- Operating systems in your EVA and EVA management configuration
- HP StorageWorks Command View EVA

## Related documentation

The following documents provide additional information about this and related products:

- *HP StorageWorks Business Copy EVA administrator guide*
- *HP StorageWorks Continuous Access EVA administrator guide*
- *HP StorageWorks Continuous Access EVA 2.1 release notes*
- *HP StorageWorks EVA software compatibility reference*
- *HP StorageWorks JREserver installation instructions*
- *HP StorageWorks Replication Solutions Manager Command Line User Interface reference guide*
- *HP StorageWorks Replication Solutions Manager online help and user guide*
- *HP StorageWorks Replication Solutions Manager 1.1 release notes*

You can find these documents on the following HP web sites:

- <http://h18006.www1.hp.com/products/storage/software/conaccesseva/index.html>
- <http://h18006.www1.hp.com/products/storage/arraysystems.html>
- <http://h18006.www1.hp.com/products/storage/software/bizcopyeva/index.html>

## Document conventions

**Table 1 Document conventions**

Convention	Element
Blue text: Figure 1	Cross-reference links and e-mail addresses
Blue, underlined text: <a href="http://www.hp.com">http://www.hp.com</a>	Web site addresses
<b>Bold font</b>	GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes.
<i>Italics font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none"><li>• File and directory names</li><li>• System output</li><li>• Code</li><li>• Text typed at the command-line</li></ul>
<i>Monospace, italic font</i>	<ul style="list-style-type: none"><li>• Code variables</li><li>• Command-line variables</li></ul>
<b>Monospace, bold font</b>	Emphasis of file and directory names, system output, code, and text typed at the command-line



**CAUTION:**

Indicates that failure to follow directions could result in damage to equipment or data.



**NOTE:**

Provides additional information.

## HP technical support

Telephone numbers for worldwide technical support are listed on the following HP web site:  
<http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign up online using the subscriber's choice web site:  
<http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

## HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-282-6672.
- Elsewhere, visit <http://www.hp.com> and click **Contact HP** to find locations and telephone numbers.

## HP storage web site

The HP web site has the latest information on this product as well as the latest drivers. Access storage from <http://www.hp.com/country/us/eng/prodserv/storage.html>. From this web site, select the appropriate product or solution.

## Helpful web sites

For other product information, see the following web sites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- <http://www.hp.com/support>
- <http://www.docs.hp.com>

## Providing feedback

We welcome your feedback!

- For HP Command View EVA, please mail your comments and suggestions to:  
 CVFeedback@hp.com
- For HP Business Copy EVA and HP Continuous Access EVA, please mail your comments and suggestions to: EVAReplication@hp.com



# 1 Installing the software

The software has two parts:

- The server software is installed on a management server.
- The host agent is installed on storage hosts.

See the *HP StorageWorks EVA software compatibility reference* for supported management servers and storage hosts.

This chapter explains how to install, reinstall, or update the software on a management server and storage hosts.

For reinstallations and updates, screen content differs slightly from installations, and you may need to restart the management server.

See [Chapter 7: Troubleshooting](#) for software troubleshooting information.

## Requirements

- The space required for software installation is specific to each operating system. The installation wizard alerts you if there is insufficient space.
- Only one instance of the server software can manage each array(s) on the management server and storage hosts.
- Place all executable and JAR files into a single directory.
- For complete hardware and software version requirements, see the *HP StorageWorks EVA software compatibility reference* on the HP Command View EVA web site:  
<http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html>.
- If installed, Storage Area Manager must be in the default directory (%Program Files%\Hewlett-Packard\sanmgr) on the management server.
- While installing the server software, you will need to supply the IP address of at least one client. If the management server does not contain Storage Area Manager, you also need to supply the server's IP address. You can add IP addresses for additional clients after installation.

# Installation best practices

- When installing over a network, always use one of the following to install the software and enable reinstallation and removal in the future.
  - For Windows, use Terminal Services and the Add/Remove Programs feature. The software may be on a CD in the CD-ROM drive or copied to a local drive on the management server or storage host.
  - For UNIX hosts, use Telnet in a secure environment. Otherwise, use Secure Shell (SSH) client.
- Install the software on the SMA using the setup files. Use the Add/Remove Programs utility, not the SMA software interface.
- HP recommends allocating an additional 300–400 MB on the management server to account for log and database growth.
- Immediately install the JREserver package on the same server as the RSM server software to facilitate obtaining the preferred JRE for browsing to the software interface. A supported JRE is required on the browsing client. See the *HP StorageWorks JREserver installation guide* for details.
- In failover configurations, HP recommends installing the software on the same server type (that is, a dedicated or general purpose server) at the local and remote sites.
- Save (export) the software database whenever the configuration changes and on a regular schedule.
- If the files that exist on the server or host are newer than the software installation files, HP recommends that you *do not* replace these files.

## Installation scenarios

### Storage Area Manager management server

A host agent cannot be installed on the Storage Area Manager management server. On a SAN-attached Storage Area Manager management server, server software is on this station and running. On a LAN-attached Storage Area Manager, server software is installed on the SAN and is used to deploy host agents to remote clients while also installed on the remote clients to perform replication tasks.

Perform the following procedure for a LAN-attached Storage Area Manager configuration:

1. The replication management server should be installed on the management station and general purpose server (GPS) within the SAN.
2. Deploy all host agents in the SAN from the management station.
3. Perform the replication management from the GPS.

### Existing Storage Area Manager host agent with unsupported Storage Area Manager host agents

The installation aborts with an error when an unsupported version of Storage Area Manager is discovered and requires an upgrade to a supported version.

### Existing management server with unsupported Storage Area Manager host agents

The installation aborts with an error when an unsupported version of Storage Area Manager is discovered and requires an upgrade to the minimum supported version.

Perform the following procedure to upgrade to the supported version:

1. Upgrade the management station to Storage Area Manager 3.2 or later.
2. Upgrade the host agents to the management station's version of Storage Area Manager.
3. Upgrade the replication manager host agents to the current version.

## SMA

Use the Windows `setup.exe` file. Do not use the SMA interface for this installation.

### SMA with Storage Area Manager

Use the Windows `setup.exe` file. Do not use the SMA interface for this installation.

### Acquiring manually installed host agents via Storage Area Manager

This is not supported.

## Executable file names

### **Server:**

- `setupRSMWin32.exe`

### **Host Agents:**

- `setupwin32.exe` for Windows
- `setupHP11.bin` for HP-UX 11.11 (11i v1)
- `setupHPIA64.bin` for HP-UX 11.23PI (11i v2)
- `setupLinux.bin` for Linux
- `setupSolaris.bin` for Solaris
- `setupAix.bin` for AIX 5.2
- `setupWinIA64.exe`

## Installing the server software

The server software always installs in `%Program Files%\Hewlett-Packard\sanmgr`. No user-defined installation directory capability is provided. During reinstallations, the installation program stops any Storage Area Manager services.

1. Close active applications on the management server.
  - Close all browser windows, Microsoft Management Console (MMC) sessions, and Java applets that are open to and on the management server.
  - Close any Storage Area Manager application performing management tasks.



### **CAUTION:**

If you choose to install the software using Terminal Services, ensure it is configured to the administrator mode.

2. Open **Add/Remove Programs** or a DOS command window.
3. Navigate to the software **setupRSMWin32.exe** file.
4. Double-click the **setupRSMWin32.exe** file to initiate the installation or enter **setupRSMWin32.exe -console** in the DOS command window.
5. Follow the InstallShield Wizard instructions to install the software.

The program prompts you to accept the terms of the license agreement and to enter the IP addresses of the management server (if Storage Area Manager is not installed) and remote browser clients.

At least one browsing client IP address is required to continue. If a client will not be used to access the software, enter the management server IP address. For reinstallations and upgrades, IP panels are not shown.

During reinstallations or updates, the wizard may request a reboot. In this case, restart the server to finalize the installation.

If you are upgrading from a previous version, a message advises you to restart services if you cancelled the database migration.



#### NOTE:

When upgrading from RSM 1.0 to RSM 1.1, the events of RSM 1.0 are not available through RSM 1.1.

---



When the installation is complete, the software icon  appears on the desktop.

On servers without Storage Area Manager, both the software and the Storage Area Manager host agent should be listed in Add/Remove Programs. On servers with Storage Area Manager, only the software should be listed. If the software does not appear in the query list, see [Chapter 7: Troubleshooting](#) and repeat the installation.

## Installing host agent software

There are two ways to install the host agents:

- Remotely, using Storage Area Manager.
- Locally, running the installation wizard on the host.

### Remote deployment

When using Storage Area Manager, *do not* manually install the software host agents on a host. Instead, deploy all the software host agents from the management server. See <http://h18006.www1.hp.com/products/storage/software/sam/index.html> for Storage Area Manager documentation.

When using a Storage Area Manager management server to deploy the HP Replication Solutions Manager host agent to a Windows host, the Windows host must have its boot partition installed on the C:\ or D:\ drive. See [Chapter 5: Using Storage Area Manager to deploy host agents](#).

### Local installation

Local installation requires one of the following:

- Copying the host agent software (an executable file and a JAR file) to the host
- Running the installation from the software CD-ROM located in the local CD drive

The installation process is nearly identical for all supported operating systems, but the executable file for initiating the installation depends on the host operating system



**NOTE:**

When using Storage Area Manager, ensure that Storage Area Manager 3.2 is installed before installing HP Replication Solutions Manager.

## Upgrading the replication software



**CAUTION:**

Stop all jobs before upgrading the software to avoid errors.

When upgrading the database and performing full migration, the current software will discover which version is installed, and you will see a blue bar indicating that the software is installing. No IP panels are shown. If you want to add IP addresses, see [Adding remote access IP addresses](#).

To ensure that you have the minimum supported versions of the HP Replication Solutions Manager server, HP Replication Solutions Manager host agent, and HP Command View EVA installed, see the *HP StorageWorks EVA software compatibility reference*.

## Software verification

Verify the software in the programs listed by the native installer:

- For Windows—Add/Remove Programs
- For HP-UX—swlist | grep HP
- For Linux—rpm -qa | grep HP
- For Sun Solaris—pkginfo | grep HP
- For AIX—lslpp -L all | grep HP

To verify installations from a remote location:

- For Windows, use Terminal Services to access the server or host and log in.
- For UNIX, use Telnet or SSH to access the host and log in.

Expected query results:

- Servers list HP Replications Solutions Manager.
- Windows hosts list HP StorageWorks Replication Solutions Manager Host Agent.
- UNIX hosts list package names HPSWRSMHA, HPOVSAMHA, and HPOVSAMJR.

On servers without Storage Area Manager, both HP Replication Solutions Manager and the Storage Area Manager host agent should be listed. On servers with Storage Area Manager, only HP Replication Solutions Manager should be listed.

The installation is successful if the expected software appears in the query list. If it does not appear in the query list, see [Chapter 7: Troubleshooting](#) and repeat the installation.

## Registry verification for Windows

The registry key for HP Replication Solutions Manager is a2c86244de532b9fa0947ae5525eb9a4.

- The information location for a management appliance: HKEY\_LOCAL\_MACHINE\SOFTWARE\Compaq\Replication Solutions Manager\version.
- The information location for all other installation types: HKEY\_LOCAL\_MACHINE\SOFTWARE\Hewlett-Packard\Replication Solutions Manager\version.

# 2 Configuring the software

## Starting the software



### CAUTION:

The software uses the HP Command View EVA service (called "nsaServer" or HP Command View EVA) to access arrays. Make sure this service remains running at all times. Also, never stop the Storage Area Manager HostAgent or Storage Area Manager ManagementServer services. These services halt all software operations and jobs and can cause a loss of data if not properly coordinated.

Methods of starting the application include:

- From an icon placed on the desktop during installation  
Use this method if you are logged on the management server directly or through Terminal Services. Do not browse to the software from the management server.
- From an authorized client specified during installation or added later (see [Adding remote access IP addresses](#)).

Install a supported Java Runtime Environment (JRE) on any computer used to browse to the server. See the *HP StorageWorks JREserver installation guide*.

All software jobs must be stopped before installing any application that may require a server restart or that stops or restarts the HP Command View EVA service (nsaServer).

### From the software icon (application mode)

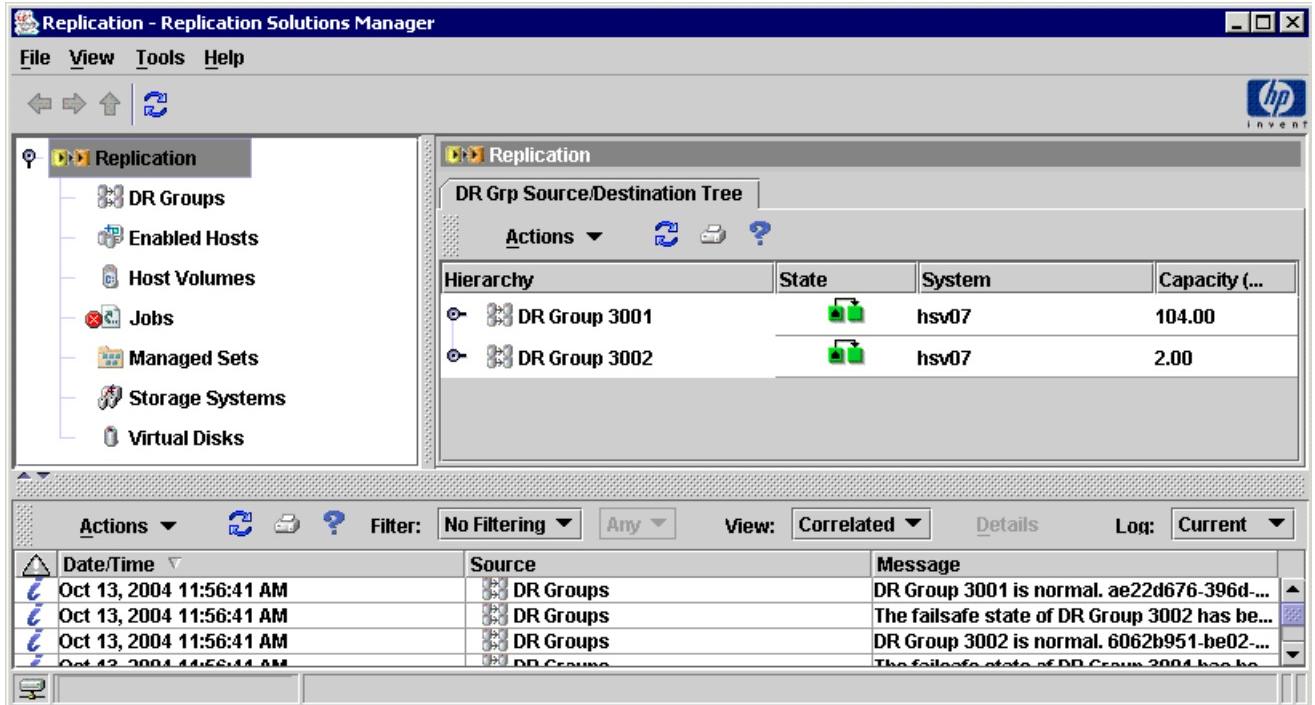
1. Log in to the management server. Use Terminal Services to log in remotely.
2. Double-click the software icon  on the server desktop or C:\Program Files\Hewlett-Packard\sanmgr\commandview\server\browser\start\_gui.bat.  
A DOS window appears while the software starts.
3. Log in to the software.

Enter the user name (originally administrator) and password (originally administrator).



### NOTE:

HP recommends changing the login password for all administrator and user accounts after accessing the software for the first time. See [Changing the password](#).



**Figure 1 The software interface example**

## From an authorized client (applet mode)

An authorized client is any computer whose IP address is entered in the management server's access list. If you did not enter the IP address during installation, you can add it now. See [Adding remote access IP addresses](#).

Using a browser on an authorized client, you can start the software:

- By direct access
- Through the SMA software interface

Before using either method, verify that supported JRE and browser versions are installed. (See *HP StorageWorks EVA replication compatibility reference*.) Supported JREs and setup instructions are provided on the HP StorageWorks JREserver CD (in the product kit).

## Browsing directly to the software

1. If you installed a new JRE, close all open browser sessions on the client.

Closing and restarting the browser allows a new Java version to be recognized.

2. Open a Web browser and browse to the software on the management server:

[http://<MyServerName\\_or\\_IP\\_Address>:4096](http://<MyServerName_or_IP_Address>:4096)

3. Log in to the software.

Enter the user name (originally `admin`) and password (originally `nimda`).



#### NOTE:

HP recommends changing the login password for all administrator and user accounts after accessing the software for the first time. See [Changing the password](#).

## Browsing to the software through the SMA

1. If you installed a new JRE, close all open browser sessions on the client.  
Closing and restarting the browser allows a new Java version to be recognized.
2. Open a Web browser and browse to the SMA:  
[//http:<MyServerName\\_or\\_IP\\_Address>](http://<MyServerName_or_IP_Address>)
3. Log in to the SMA. (See *HP OpenView Storage Management Appliance user guide* for login information.)
4. Click **Settings**.
5. Click **Manage Tools**.  
Verify that the software is installed. (The version is "unknown.")
6. Click **Tools**.
7. Click **replication solutions manager**.
8. Log in to the software.  
Enter the user name (originally admin) and password (originally nimda).



#### NOTE:

HP recommends changing the login password for all administrator and user accounts after accessing the software for the first time. See [Changing the password](#).

## Configuring the software

Perform the following tasks as needed after installing the software.

### Changing the password

HP recommends changing the administrator login password for all administrator and user accounts after accessing the software interface for the first time. This procedure requires administrator-level access.

1. Access the server software and log in as an administrator.
2. Start the software.
3. Select **File > Change Password**.
4. Enter the old and new passwords.

5. Click **OK**.

## Adding remote access IP addresses

Use the following procedure to add remote access IP addresses after installing the server software. Host names *cannot* be added to this list in place of IP addresses. This procedure requires administrator-level access.



### CAUTION:

If your network security is considered high, HP recommends adding an entry that allows all clients to access the server, such as `*.*.*.*`. *Do not* add a general entry if you feel that your SAN is vulnerable to insecure access.

1. Access the server software and log in as an administrator.

2. Navigate to the following file:

- On management servers without Storage Area Manager:

`C:\Program Files\Hewlett-Packard\sanmgr\hostagent\config\access.dat`

- On management servers with Storage Area Manager installed:

`C:\Program Files\Hewlett-Packard\sanmgr\managementserver\config\authorizedClients.dat`

3. Open the file using a text editor.

4. Review all IP addresses listed.



### CAUTION:

Both server and client IP address are listed. Modification or removal of a server IP address prevents communication between the associated server software and host agents.

5. Modify or remove existing IP addresses or add new addresses.

## IP addresses on UNIX systems

During a normal installation of HP Continuous Access EVA on a UNIX system, you are prompted to enter the IP address of the local host. The IP address is saved in `/opt/sanmgr/hostagent/config/commIpAddr.txt`. Removing HP Continuous Access EVA does not remove the IP address, and you are not prompted for the IP address if you reinstall. If you entered the IP address incorrectly or changed the IP address of the local host, you must manually edit the `commIpAddr.txt` file.

To change the IP address of the local host:

1. Open the `/opt/sanmgr/hostagent/config/commIpAddr.txt` file.
2. Change the IP address in the `commIpAddr.txt` file.
3. Restart the Storage Area Manager host agent.

## Installing the JREserver

See the *HP StorageWorks JREserver installation guide*.

## Configuring Windows systems with multiple NICs

Installing the host agent software in a standalone system with multiple NICs or Windows cluster environment with multiple NICs might require changing the IP binding order. The IP binding order must list the NIC first on the network where the server software resides.

Use the following procedure to configure each Storage Area Manager Host Agent:

1. Open Control Panel and then double-click **Network and Dial-up Connections** (Windows 2000) or **Network Connections** (Windows 2003).
2. Select **Advanced > Advanced Settings**.
3. From the Adapters and Binding tab, is the NIC listed at the top for the network where the software server resides?
  - Yes. No further action is required.
  - No. Move the NIC to the top, click **OK**, and reboot the host.

## Adding device files on Linux hosts

The Linux host agent includes a utility script, `makesg.sh`, that can be found in the install location:

```
.../sanmgr/bcca_agent/bin/
```

By default, Red Hat Linux uses `/dev/sg0` to `/dev/sg31`, allowing for 32 SCSI devices. SUSE Linux uses `/dev/sg0` to `/dev/sg15`, allowing for 16 SCSI devices. To correctly discover all LUNs presented to a host, as many `/dev/sg` device files are needed as there are SCSI devices seen by the host at any time.

If you observe information missing from the host-related views or experience failures during the CreateHostVolume step of jobs, the cause may be an insufficient number of `/dev/sg` device files.

1. Check the number of SCSI devices that the host sees by running the command  
`cat /proc/scsi/scsi` from the command line on the host.
2. Count the number of attached devices.
3. Check the number of `/dev/sg` device files by running the command `ls /dev/sg*`.
4. Count the number of `/dev/sg` files that end in numeric values. (The `/dev/sg` files that end in alphabetic characters from "a" upwards are links to the numeric versions and are no longer used.)
5. If there are fewer `/dev/sg` files (from Step 5) than the number of devices (from Step 2), run `makesg.sh`, specifying the total number of devices.

The `makesg.sh` utility script creates missing `/dev/sg` device files up to the number specified. Those `/dev/sg` files in the range of 0-(num-1) that already exist are not modified.

You should have one `/dev/sg` device file for each SCSI device, including directly attached SCSI devices, SAN arrays, and each LUN presented to the host.



# 3 Replication management

After an introduction to the software and basic replication concepts, this chapter describes the management tasks you can perform using HP Replication Solutions Manager.

## Concepts

### Snapclone

A snapclone is an independent, point-in-time copy (replica) of a virtual disk. The replica is created as a fully allocated snapshot and, over time, becomes an independent virtual disk.

### Snapshot

A snapshot is a virtual point-in-time copy (replica) of a virtual disk. Snapshots save space by copying point-in-time data only when it changes on the source. A snapshot always depends on the source virtual disk. A demand-allocated snapshot is a point-in-time copy in which the allocated disk space can change on demand from an initial minimum amount up to the full capacity of the source. A fully allocated snapshot is a virtual copy in which the allocated disk space is initially set to, and remains fixed at, the full capacity of the source at the moment of replication.

An HP Business Copy EVA license is required to use snapshots and snapclones.

### DR groups

A data replication (DR) group is a named group of virtual disks selected from one or more disk groups so that they remotely replicate to the same destination, fail over together, share a log (DR group log disk), and preserve write order within the group.



#### NOTE:

You need an HP Continuous Access EVA license to use DR groups and managed sets. Each source and destination array must have its own HP Continuous Access EVA replication license.

### Managed sets

A managed set is a named collection of resources banded together for the purpose of management. For example, the managed set Sales\_Disks might include two virtual disks, West\_Sales and East\_Sales.

Performing an action on a managed set performs the action on all the members in the set. For example, if you perform the New Snapshot action on the managed set Sales\_Disks, the interface creates a snapshot of West\_Sales and a snapshot of East\_Sales.

## Replication manager logs

The following logs track and record activity in the replication manager:

- Event log—Contains system-generated messages resulting from:
  - User-initiated actions (for example, suspend DR group).
  - Replication-related storage events (for example, DR group is constructing).
  - Jobs (for example, job complete).Messages are written to a set of five rotating files. The default size limit for each file is 1 MB. As the current file reaches its size limit, it is closed, rotated out, and a new file is opened. You can view the messages in the Event pane of the replication manager. See the online help for more information.
- Trace log—Contains all events. Intended for HP personnel. Events that are useful to the user are transferred to the Event log and displayed in the Event pane. The Trace log is allotted 60 MB. As the log fills the space, old messages are discarded. You can view the Trace log in the Configuration window in the replication manager.
- Security log—Contains the following security activities:
  - Successful attempts to access the replication manager
    - Failed attempts to access the replication manager
    - Failed authorization credentials
    - Changes to security user accounts and group membershipThirty days of security log history are saved by default. On the thirty-first day, the oldest entries are discarded. You can change the default to any number of days. HP recommends you save no more than 30 days. The file to change is called `security.cfg` and is located on the replication manager server in `C:\Program Files\Hewlett-Packard\sanmgr\security\config\`. Security logs are .txt files located on the replication manager server in `C:\Program Files\Hewlett-Packard\sanmgr\security\logs`.
  - Transaction log—Contains the replication manager database contents. Service personnel can access this log to recover data if a database is corrupted. No user action is needed or allowed on this log. Space needs vary for the log depending on database activity. However, space needs are generally less than 20 MB.

## About the software

HP Replication Solutions Manager is an interactive, visual environment for replicating data on supported storage arrays. After using array management software to create and present virtual disks for host access, you can use the replication software to:

- Automatically discover array, virtual disk, and host resources.
- Copy virtual disks and host volumes using snapshot and snapclone technology.
- Create, modify, and delete remote replication relationships (DR groups).
- Fail over, suspend, resume, and change failsafe mode by DR group.
- Create and delete managed sets.
- Dynamically mount virtual disks on enabled hosts.
- Create, schedule, and run replication jobs.
- Monitor array status (copy, failsafe, logging, merging).
- Create and restore configuration databases for managed sets and jobs.

Snapshots, snapclones, DR groups, and other terms are described in [Concepts](#). For operational instructions, see online help in the graphical interface.

## Monitoring events

An event is a system-generated status message resulting from a:

- User-initiated action (for example, "suspend DR group")
- Replication-related or array incident (for example, "retrieved data for array")
- Job (for example, "job complete")

Event message categories include:

- DR group
- Storage system
- Job
- Error event
- Dialog box

Event messages can be helpful when troubleshooting. Messages are collected by monitoring the messages written to the Trace log files. Whenever a relevant message is written, it is posted in the GUI Event pane. The Event pane provides a description of the event codes, including the severity, the date and time when the event occurred, the source component of the event, and an explanation.

You can perform several event handling actions in the GUI, such as:

- Sort and filter columns.
- Display events in chronological order (standard view) or display the latest event for each resource (correlated view).
- View historical logs.
- Connect to a resource in the navigation pane by clicking the corresponding source entry in the Event pane.

The software periodically polls for messages to display. You can also manually refresh content in the pane. See the online help for more information on using the event pane.

## About the CAUI and RSM databases

The HP Replication Solutions Manager has completely replaced the HP CAUI legacy product. You can copy a database using the export feature (except to a network share drive). You can also append a database with a previously created copy using the import feature. For remote replication, you can use the export and import features to duplicate the active database on the standby server. See the online help for export and import procedures.



#### NOTE:

Before you import a database into the replication manager, the HP Command View EVA instance residing on the same server as the HP Replication Solutions Manager must control the arrays discovered by the replication manager.

Importing a database also imports the password from the active management server. If that password is different than the password on the standby management server, the DR groups are displayed in an unknown state and no action can be taken on them.

Before you import a database to a standby server, an HP Command View EVA instance must have control of the arrays presented to the replication manager on the standby server. The replication manager must complete the discovery of these storage objects.

---

Database copies are XML files with names in the following format: CADATA\_timestamp.export.xml where timestamp is the year, month, day, hour, minute, and second the file was created. For example, the file CADATA\_20050211135232.export.xml was created on February 11, 2005, at 13:52:32 hours. Copies can be created in any existing folder on the management server.

## Accessing the database

Administrators can specify the server port (Database Port) through which all internal communication with the database occurs.

1. In the Configuration navigation pane, select **Database**.
2. Select **Access**.
3. Specify the port number through which all communication occurs. The port number is set by default and does not normally change; change only if the port conflicts with other applications on your server.
4. Click **OK** to apply the settings and close the Configuration window, or click **Apply** to apply the settings and leave the window open.

## Migrating data from HP Continuous Access EVA User Interface

Migrating an HP Continuous Access User Interface database to HP Replication Solutions Manager allows you to keep the managed sets you created in the UI. It does not preserve any state information from the array. Use the back up database feature in UI and the import feature in the replication manager.

In UI, you could add the source and destination side of a DR group into a managed set. However, in the replication manager, you can add only one side (the source or destination). When migrating, the replication manager updates the managed sets to include whichever side you added first to the managed set in UI.

1. In UI, back up the database (see the UI online help). Back up the current UI configuration (database) to a network share that is accessible by the management server.



#### NOTE:

If possible, save the database on the same server where the replication manager will be installed; otherwise, you must move it later.

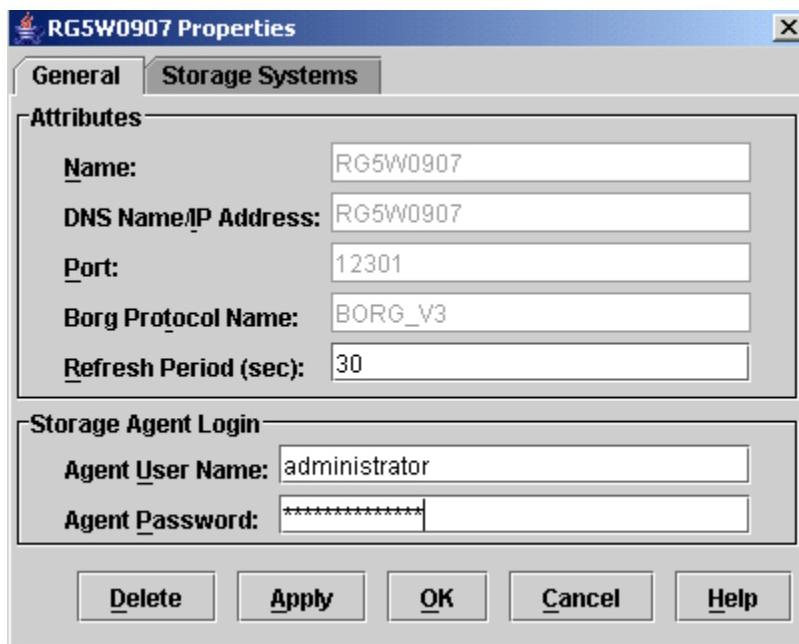
2. Copy the database folder to a local drive on the management server.
  3. Remove UI and install the replication manager (see the installation documentation for the proper version documentation.).
  4. Using HP Command View EVA on the server with the replication manager, take control of the arrays (see *HP StorageWorks Command View EVA user guide*).
  5. Access the replication manager.
  6. Select **Tools > Import CAUI V1.x Database**.
- The Import legacy CAUI Database window opens.
7. Enter the path and file name of the database you want to import.
  8. Click **OK**.

## Changing the password for the management server

To change the password for a management server:

1. In the replication manager, select **Tools > Configure > Storage Access > Management Server**.
2. Select the management server whose password you want to change.
3. Click **Properties**.

The Properties window opens, displaying the General tab.



**Figure 2 Properties window**

4. Under the Storage Agent Login area, enter the correct password in the Agent Password box.
5. Click **OK**.

# Importing user accounts and group data

The same data is imported whether you import user accounts or groups.

To import user accounts and group data:

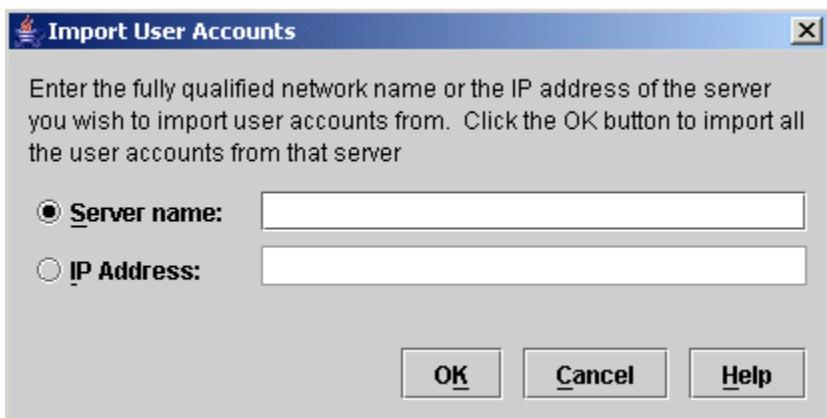
1. On the standby server, select

**Tools > Configure > Security > Users > Import**

or

**Tools > Configure > Security > Groups > Import.**

The Import User Accounts window opens.



**Figure 3 Import User Accounts window**

2. Enter either the server name or IP address of the active server (where the user accounts and groups are located) and click **OK**.
3. Enter the user name and password for the active server.
4. Click **OK**.



#### NOTE:

Any time the configuration changes regarding user names or groups, you must perform this procedure again.

## Automatic discovery and database refresh

The replication manager automatically discovers resources and refreshes its database at the intervals noted in the online help. When new resources are found, it may take some time to gather the new information and add it to the database.

New enabled hosts are not automatically discovered or added to the database. For the hosts to be visible to the replication manager, an administrator must manually add them after installing the host agents (see [Manual discovery and database refresh](#)).



#### NOTE:

A discovery can take several minutes or more depending on the size of the environment.

Depending on the configuration and tasks, you may want to adjust the automatic discovery and database refresh interval. If other applications are using the same EVA arrays or are installed on the same management server, a short discovery and database refresh interval may slow the performance of the storage arrays or management server. In this case, consider a longer period.

- If the storage configuration is large or there are delays in the environment, discovery and database refresh can take a long time and may slow the replication manager.
- If you are configuring an environment or performing testing, the default discovery and database refresh interval may be too long for changes to be reflected quickly. In this case, consider temporarily setting the interval to a few minutes.
- If you are only monitoring storage, the default discovery and database refresh interval may be shorter than required. In this case, consider setting the interval to several hours.

## Manual discovery and database refresh

In some circumstances, you may want to manually force the replication manager to discover resources and refresh its database rather than waiting for an automatic discovery. Typical use of the manual database refresh is to force an update of the database after resources have been changed by applications other than the replication manager. Clicking the database refresh icon on the toolbar performs a discovery of available storage arrays, virtual disks, enabled hosts, and host volumes and updates the replication manager database. Do not click this icon to refresh the content pane or event pane. Instead, use the refresh buttons on the respective panes. To ensure that you are about to use the correct refresh icon, move the mouse pointer over the icon. A tooltip displays whether the refresh is for the database or a content pane. New enabled hosts are not automatically discovered or added to the database. To be visible to the replication manager, an administrator must manually add them after installing replication manager host agents.

## Cleaning up the database

Administrators can perform database "housekeeping" by purging the database of data from arrays with which the replication server cannot communicate.

1. In the Configuration navigation pane, select **Database**.
2. Select **Cleanup**. The interface lists the arrays whose data the replication server contains but with which it cannot communicate.
3. Select the array whose data you want to delete and then click **Purge**.
4. Click **OK**.

## Jobs

A job is a repeatable, replication-specific command or set of commands that automates replication tasks. A job can be simple (for example, create a DR group) or complex (for example, perform cascaded replication). You can run a job from the GUI, from the command line, from batch files, or by a scheduler.

Job events are stored in log files. The job monitor panel displays the events of a given instance of a job from the current log file. When the log reaches a certain size, it changes to a .1 history file. History file

contents are available for viewing in the events pane of the main screen. Only five of these history files are stored, and once the event rolls off the last history file, it is permanently deleted.

For more information, see the online help.

## Command line user interface

The command line user interface (CLUI) allows you to perform various replication tasks using individual commands and command scripts.

Using the CLUI, you can:

- Perform remote replication.
- Mount and unmount storage volumes.
- Run jobs from a host's command line user interface.
- Write scripts that run jobs.
- Use job return codes for conditional interactions between jobs and host scripts.
- Display resource information.

The CLUI is installed when you install the replication manager.

# 4 Best practices

This chapter describes replication best practice procedures.

## Backing up replication jobs and configurations

HP recommends that you perform regular backups of jobs and configurations using the save feature. This ensures that job and configuration data can be easily restored during planned or unplanned maintenance of the replication server.

## Avoiding job failure

- Minimize simultaneous job execution, even if the jobs involve different arrays. For example, running too many replication manager jobs at the same time can reduce the overall responsiveness of the replication manager and of other applications on the replication management server.
- Avoid changing storage and host configurations while jobs are running. For example, do not change an array configuration with one interface (for example, HP Command View EVA) while replication jobs are running in another interface. Changing resources can lead to job failures and require manual intervention to restore resources to operational readiness.
- Ensure that planned shutdowns are coordinated. Stopping an enabled host causes running jobs to fail if the job involves that host.
  - Stops any local replication applications on the server.
  - Causes running jobs to fail.
  - Prevents scheduled jobs from starting.
- If possible, avoid changing the network identification (computer network name or IP address) of a management server or a host where a host agent is running.
  - Server identification change – If identification of a replication server is changed, use documented procedures to update all associated replication host agents so they can communicate with the server. If the replication host agents are not updated to reflect the new server identification, jobs that involve the enabled host will fail.
  - Host agent identification change – If identification of a replication host agent is changed, update impacted replication jobs so the jobs provide the correct references to enabled hosts. If the impacted jobs are not updated to reflect the new host agent identification, the jobs will fail.
- Ensure that network connections between a replication management server and enabled hosts are maintained, especially while jobs are running. Jobs that interact with enabled hosts fail if the network connection is not maintained throughout the job.

# Optimizing performance

- Use configuration settings in your replication products to optimize discovery refresh intervals. Replication products require up-to-date information on SAN resources. Find a balance between a discovery refresh interval that is too short (slowing overall performance with frequent discovery) and an interval that is too long (producing job failures due to out-of-date SAN information).
- Use configuration settings in your replication products to eliminate discovery of resources that are infrequently used. Discovery of all resources in a large SAN can slow performance. For example, if a SAN includes 15 arrays but you are using local replication on only 10 arrays, deselecting 5 will improve performance during discovery.
- Keep simultaneous browser sessions to the same replication manager to a minimum. A large number of sessions decreases responsiveness of the replication manager.
- Keep the number of active enabled hosts to the minimum needed to perform required operations. Consider stopping host agent processes on hosts when they are not needed for jobs. If operational changes result in a host no longer being used in jobs, consider removing the host agent. Reducing the number of host agents that communicate with the local replication server will result in better overall performance of the replication server.

## Using log files for troubleshooting jobs

The replication management server and host agents generate log files for job events. These detailed event log files can be helpful to HP support personnel when troubleshooting replication jobs.

## Managing replication events

Develop operation guidelines and best practices to address the following situations and concerns.

### Minimizing simultaneous replication events on an array

Minimize the number of replication requests to the same array at the same time. Consider limiting access to the various management and command line interfaces. Too many simultaneous replication events can reduce array performance.

### Avoiding simultaneous replication events for the same virtual disk

Avoid making multiple replication requests to the same virtual disk at the same time. Multiple replication events to the same virtual disk not only slow performance but, in the case of automated jobs, can lead to job failures. For example, if the maximum number of snapshots per virtual disk is exceeded when the job is running, the job will fail.

## Job scheduling

When using an external scheduler to schedule jobs, consider the timing of each job relative to other jobs that involve the array and host resources. Tune and load-balance demands to maximize performance.

## Complying with EVA snapshot rules

The following general EVA snapshot rules apply:

- The array must have a local replication license.
- Each snapshot is created in the same disk family as the source virtual disk.
- All snapshots of a given virtual disk must have the same allocation policy.
- No more than seven snapshots of a given virtual disk can exist at one time.
- When managing array resources, snapshots are counted as virtual disks.

Snapshots cannot be made when a storage volume:

- Is itself a snapshot.
- Is in the process of unsharing or being deleted.

When a local replication interface indicates that an EVA storage volume (virtual disk) does not support snapshot replication, or if a snapclone script action fails in a job, it is probable that some of these rules have been violated.

## Complying with EVA snapclone rules

The following general EVA snapclone rules apply:

- The array must have a local replication license.
- Each snapclone is created in the same disk group as its source but in a different disk family.

Snapclones cannot be made when a storage volume:

- Is itself a snapshot or has a snapshot.
- Is in the process of unsharing or being deleted.

When a local replication interface indicates that an EVA storage volume (virtual disk) does not support snapclone replication or if a snapclone script action fails in a job, it is probable that some of these rules have been violated.

## Caching in Microsoft Windows

Small files in Microsoft Windows can be held in cache, disrupting replication to the remote controller. Flush all cache files, if possible, before performing a failover. One source of information for flushing data caches on CPU and kernel architecture can be obtained from:

<http://msdn.microsoft.com/library/en-us/wcedsn40/html/cqconimplementingcacheflushroutines.asp>.

Another option is to use the HP Business Copy EVA application to flush the cache. For more information, go to:

<http://h18006.www1.hp.com/products/storage/software/bizcopyeva/index.html>.



### NOTE:

Rebooting of the source host(s) is the only qualified procedure at this time.

## Asynchronous replication with failsafe enabled

Running in asynchronous replication mode with failsafe enabled is not supported. There is no benefit when using these two modes together in normal operation, and doing so may induce LUN instability after the loss of intersite links.

## Using Mozilla to browse to the replication management server

When using Mozilla to browse to the replication management server, you must add the Mozilla path to your *PATH* environment variable. Otherwise, you may experience problems using replication management server help.

# 5 Using Storage Area Manager to deploy host agents

## Overview

Only Storage Area Manager provides deployment capabilities for software host agents. This chapter provides a fundamental procedure for deploying and removing software host agents using Storage Area Manager. See *HP OpenView Storage Area Manager installation guide* for additional deployment and removal information. To avoid the complication of host agent deployment by performing the manual procedure, see [Installing host agent software](#).



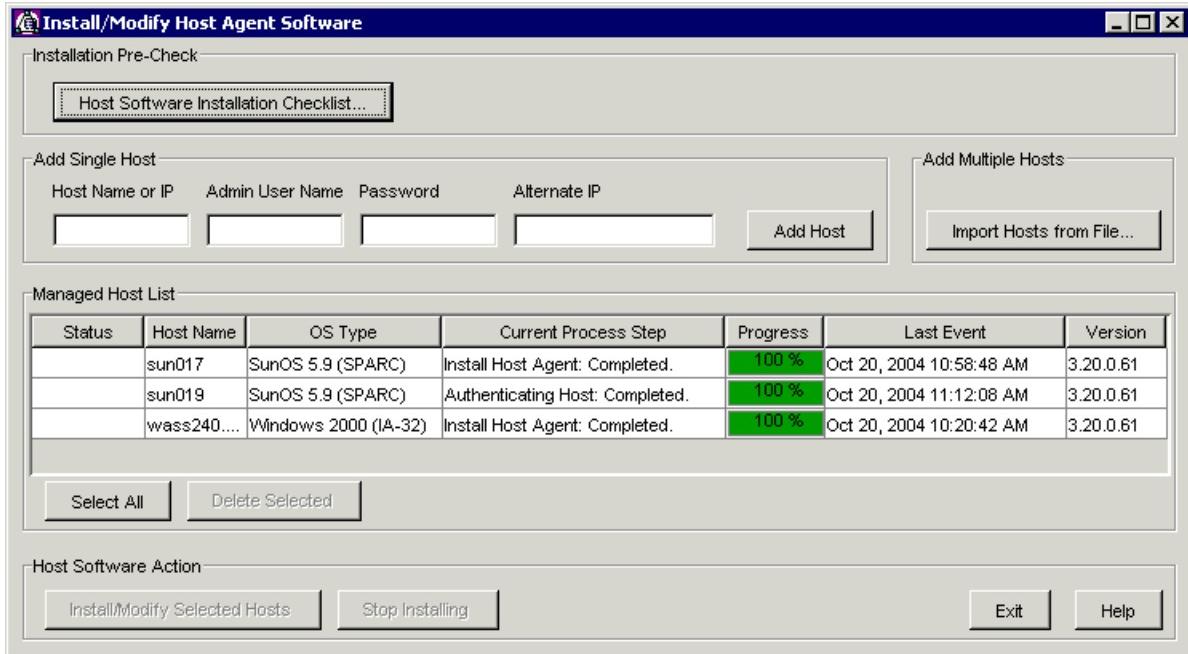
### NOTE:

A software host agent installed on a host by Storage Area Manager deployment can be removed from the host only by Storage Area Manager.

## Deploying a software host agent

After installing a software server on a management server that contains Storage Area Manager, deploy each software host agent to specific hosts. Deploying a software host agent package to a specific host requires that the Storage Area Manager Host Agent software be deployed to this host first. Use the following procedure to deploy the software host agent:

1. From the management server, open the Storage Area Manager interface.
2. Select **Tools > Manage Host Agent > Install/Modify Host Agent Software**.



**Figure 4 Installing or modifying Storage Area Manager packages**

3. Does the specific host appear in the Managed Host List?
  - Yes, continue with [Step 8](#).
  - No, continue with the next step.
4. Under Add Single Host:
  - For Host Name or IP, enter the host IP address.
  - For Admin User Name and Password, enter administrator-level access information.
5. Click **Add Host**.
6. Under Managed Host List, select the new host entry.
7. Click **Install/Modify Selected Hosts**.
8. Right-click the specific host and select **Modify Host Packages Selection**.

A window appears listing the packages currently available.



**NOTE:**

The Host Agent Core and Apps package is required. You can only select **Install** for this package.

9. Under Action to Take:
  - Select **Install** to install the Storage Area Manager Host Agent software.
  - Select **Install** to install the software host agent software.

**NOTE:**

All software hosts must receive both the Storage Area Manager Host Agent and software host agent packages for full software capabilities.

10. Click **OK**.

The Install/Modify Host Agent Software window displays.

11. Select **Host**, then click **Install/Modify Selected Hosts**.

Repeat this procedure for all software host agent deployment installations as desired.

Also, see [Configuring Windows systems with multiple NICs](#) to complete the installation.

## Upgrading Storage Area Manager

See <http://h18006.www1.hp.com/products/storage/software/sam/index.html> for Storage Area Manager documentation.

## Removing deployed software host agents

HP recommends removing the software host agent from the host before removing the Storage Area Manager Host Agent. The process for removing these host agents is identical except for selecting the desired package before initiating the removal.

Remove a deployed software host agent using the following procedure:

1. From the management server, open the Storage Area Manager interface.
2. Select **Tools > Manage Host Agent > Install/Modify Host Agent Software**.
3. Right-click the specific host and select **Modify Host Packages Selection**.  
A window appears listing the packages currently available.
4. Under Action to Take for Replication Solutions Manager Host Agent, select **Uninstall**.
5. Click **OK**.
6. Select **Host**, then click **Install/Modify Selected Hosts**.

Repeat this procedure for all software host agent deployment installations as desired.

Not all software host agent subdirectories are removed. The files in the remaining subdirectories represent user data files or files you modified while using Storage Area Manager. [Table 2](#) lists the subdirectories remaining after a successful removal of the software host agent software.

**NOTE:**

HP recommends never removing these directories if the host may be used to link back to previous jobs and logs and OV-SAM host agent is not installed.

**Table 2 Remaining Host Agent directories**

Windows hosts	UNIX hosts
C:\Program Files\Hewlett-Packard\sanmgr\hostagent	/opt/sanmgr/hostagent; /etc/opt/sanmgr/hostagent; /var/opt/sanmgr/hostagent

# 6 Removing the software

## Overview

This chapter describes how to remove the software from a server or host.



### CAUTION:

Always remove the server before the host agent.

## Removing the server software

You can remove the server software locally or by using remote connection software.

### Requirements

- Allow all replication jobs to run to completion or disable scheduled jobs before initiating a removal to prevent data loss.
- Removing the software over a network without remote connection software is not supported and could create errors.



### NOTE:

Remove the software from the SMA using only Windows Add/Remove Programs. The SMA software interface cannot be used to remove the software.

Convert a general purpose server to a host by removing only the server software and leaving the host agent installed.

## Procedure

1. If removing the server software over a network, use Terminal Services to access the management server and log in.
2. Open **Add/Remove Programs**.
3. Navigate to the HP Replication Solutions Manager.
4. Click **HP Replication Solutions Manager**, then click **Remove**.
5. Follow the InstallShield Wizard instructions to remove the software.
6. Click **Finish** to exit.

# Removing host agent software



## CAUTION:

The management server requires a reboot to complete the removal if there is a replication server window open in the GUI.

Important: Host agents deployed using Storage Area Manager can be removed using only Storage Area Manager.

The following procedures describe how to remove host agent software from a server or host that was not deployed using Storage Area Manager. You must use Storage Area Manager to remove host agents that were deployed by that application.

## Requirements

- Allow all the software jobs to run to completion, or stop them before initiating a removal.
- For server configurations, always remove the server software before removing the host agent software. The host agent software aborts the removal if the server software is detected on the same server.

Remove the host agent software using either the software interface or command-line procedure applicable to each host.

## Procedure

1. Access the server or host on which the removal is desired. If removing software from a host over a network, use remote connection software to access the host and log in.
2. For Windows, open **Add/Remove Programs**.  
For Unix, open a command window.
3. For Windows, navigate to the HP Replication Solutions Manager Host Agent in the Add/Remove Programs list.  
For Unix, navigate to /opt/sanmgr/bcca\_agent/\_uninst/.
4. For Windows, click **Change/Remove** beside the HP Replication Solutions Manager Host Agent listing to initiate the removal.  
For Unix, run /opt/sanmgr/bcca\_agent/\_uninst/uninstall.bin to initiate the removal.
5. Follow the InstallShield Wizard instructions to remove the software.
6. Click **Finish** to exit.

# 7 Troubleshooting

This chapter describes known problems and suggested resolutions for troubleshooting the software server installation.

## **Issue: The software installation error or warning message appears**

Description: Sometimes a server service (Storage Area Manager HostAgent or Storage Area Manager ManagementServer) does not start during installation and generates this message.

Resolution: Either manually start the service on the server using the Windows Control Panel services applet or reinstall the server software.

## **Issue: The software interface does not appear after starting the software**

Description: This error may occur because the Terminal Services is not configured in administrator mode.

Resolution: Remove the software using Add/Remove Programs from the server and then reinstall the software again using Add/Remove Services (see [Chapter 1: Installing the software](#) and [Chapter 6: Removing the software](#)).

## **Issue: Browsing to the software interface generates a JRE pop-up window**

Description: This error may occur because the JRE on the browser client is not a supported version.

Resolution: See *HP StorageWorks JREserver installation guide* to install a supported JRE version on the browser client. Also, use [Adding remote access IP addresses](#) to make sure the browser client IP address is listed. If this address is not listed, manually add the address, restart the Storage Area Manager HostAgent or Storage Area Manager ManagementServer service, and then browse to the software again.

## **Issue: Browsing to the software generates a "Server connection refused. Is this client in the access list?" message**

Description: During software installation, browser client IP addresses are requested for accessing the software remotely. If a browser client IP address is not in the IP address list, a "connection refused" message appears after login instead of the software interface.

Resolution: See [Adding remote access IP addresses](#). You may also need to edit the access.dat file by following this procedure:

1. Navigate to the \program files\Hewlett-Packard\sanmgr\hostagent\config directory.
2. Open the access.dat file in a text editor.
3. Add the IP address of the client machine to browse from the file.
4. Save and close the file.

## **Issue: Login failure**

Description: ProLiant servers include the SmartStart utility to assist with operating system and software installation and array configuration. Using Smart Start 7.2 may cause login failures for applications using the HP Command View EVA API. Specifically, a login failure will occur if you build the management server using SmartStart 7.2 and then install the HP Command View EVA software suite.



### NOTE:

Using SmartStart 7.2 to upgrade a management server on which HP Command View EVA was previously installed will not cause the login failure to occur.

Resolution: You must reset the HP Command View API password. After installing HP Command View EVA on a ProLiant server that uses SmartStart 7.2, run the following executable (where administrator is the new password you want to use):

```
c:\Program Files\Hewlett-Packard\SANworks\Element Manager for StorageWorks  
HSV\Bin\elmsetup.exe -pA:administrator -f
```

Go to the Services window and restart the HP Command View EVA service. The new password takes effect only after you restart this service.

Consider the following when using this procedure:

- Only a user with system administrator authority can reset the HP Command View API password.
- If security of the executable used to reset the password is a concern, HP recommends that you remove this executable from the server. For example, you could put the utility on a CD and store the CD in a secure location.
- You can use this executable to reset the password if it is forgotten.

### Issue: **Starting the software generates a "no login server" error message**

Description: This error may occur because of an invalid or unavailable server IP address.

Resolution: Verify the server IP address in your browser and in the access file on the management server. Verify that the services are running on the management server.

### Issue: **RSM database does not update**

Description: When the array is uninitialized and DR groups or snapshots are deleted through the HP Command View EVA interface, the RSM database shows the objects as unknown.

Resolution: In the RSM interface, click **Tools>Configure>Database>Cleanup**. In HP Command View EVA, run the DiscoveryRefresh and Exit (SUCCESS) jobs.

### Issue: **"Server connection refused. Is this client in the access list?" error message**

Description: Clients with multiple IP interfaces remotely browsing to the appliance.

Resolution: Ensure that all client browser IP addresses are listed in the access files. See [Adding remote access IP addresses](#) and perform the following procedure:

1. Access the software server and log in as an administrator.
2. Navigate to C:\Program Files\Hewlett-Packard\sanmgr\managementserver\config\ManagementServer.cfg.
3. Change the Authentication value from 1 to **10**.
4. Save and close the file.
5. Restart the Storage Area Manager ManagementServer service or reboot your management server.

### Issue: **LUN inaccessible to a host**

Description: A "stalled LUN" event (4206001b) in HP Command View EVA indicates that a LUN has been inaccessible to the host for at least four minutes, causing the LUN to be in a quiesced state. Take the following actions to troubleshoot this situation and prevent possible data loss:

1. Verify that the host still cannot access the LUN.
2. Try to resynchronize the controller from the HP Command View EVA field service page.
3. If the situation still exists, unpresent and re-present the LUN to the host.
4. If the situation still exists, restart the controller and its partner controller, if necessary.

**Issue: DR groups in unknown state**

Description: If your DR groups are in an unknown state, check to see if you have recently imported the replication manager database from an active management server to the management server where the DR groups are in an unknown state. If so, the problem is probably that the passwords do not match on the management servers. If password mismatch occurs, an "Authorization Error" appears in the configuration panel.

Resolution: See [Changing the password for the management server](#) for more information.

**Issue: Tunnel thrash**

Description: Tunnel thrash is the frequent closing and re-opening of a tunnel while holding host I/O in the transition. This occurs when peer controllers can see each other but cannot sustain replication data with any path, even when throttled to the minimum. Some possible causes of tunnel thrash are:

- High volumes of packet loss
- Incorrectly configured routers
- Re-routed IP circuits
- Oversubscribed circuits

Although tunnel thrash is rare, a critical event (c23670c) is generated and displayed in HP Command View EVA for each DR group that shares the affected tunnel. You must intervene to prevent possible data loss.

Resolution:

- Check all routers and look for high volumes of packet loss.
- Ensure that all router are configured correctly.
- Contact your service provider to check whether the circuit has been alternate routed.
- Check to see whether thrashing occurs during peak times and not during low-volume times. If so, the circuit may be over-subscribed and you may need to increase bandwidth.



**NOTE:**

An informational event (c22000c) is generated for an open tunnel. No action is required.

---

**Issue: Remote host cannot detect a destination LUN**

Description: If you have a host that cannot detect a destination LUN, it could be that the DR group access mode is set to "disabled." A remote server can detect a LUN with a "read-only" access mode but cannot detect it if the mode is set to "disabled."

Resolution: The replication manager allows you to change the DR group's access mode from "disabled" to "read-only," thereby allowing the remote server to detect the destination LUN. See the online help for information on editing a DR group's properties.

**Issue: Long delays or time-outs on HP-UX**

**Description:** If an HP-UX host has multiple disk devices with failed or no longer presented LUNS behind them, it can take an increasingly long time to gather host information as the number of disk devices increases. If an HP-UX host exhibits time-outs on host discovery or failed jobs while waiting for host operations to complete, take the following actions:

**Resolution:**

- Check the disk devices showing long time-outs. Secure Path can display the status of the disk devices it is managing. For disk devices not managed by Secure Path, check for I/O time-outs by running an OS tool such as `diskinfo` on each disk device.

Remove any disk devices that show long time-outs if they are no longer needed.

- If the disk devices are intentionally in this state, improve performance by modifying the I/O time-out setting for those disks with the `pvchange -t` command. HP-UX has a default I/O time-out of 30 seconds for SCSI disks. The `pvchange -t` command allows you to reduce the amount of time before a time-out on a given disk occurs. Reducing the time-out decreases the amount of time a host discovery takes.

# Glossary

This glossary defines terms that are used in this guide or are related to the software.

<b>array</b>	See virtual array and storage system.
<b>client</b>	An intelligent device that requests services from other intelligent devices. In the context of HP Replication Solutions Manager, a client is a computer that is used to access the software remotely using a supported browser.
<b>DR group</b>	Data replication group. A named group of virtual disks selected from one or more disk groups so that they replicate to the same destination, fail over together if a member virtual disk fails, and preserve write order within the group.
<b>enabled host</b>	A host that is equipped with a replication host agent.
<b>EVA</b>	Enterprise Virtual Array. An HP StorageWorks product that consists of one or more virtual arrays. See also virtual array.
<b>failover</b>	An operation that reverses replication direction so that the destination becomes the source and the source becomes the destination. Failovers can be planned or unplanned and can occur between DR groups, managed sets, fabrics or paths, and array controllers.
<b>general purpose server</b>	A server that runs customer applications such as file and print services. HP Command View EVA and HP Replication Solutions Manager can be used on a general purpose server in limited configurations.
<b>host</b>	A computer that runs user applications and uses (or potentially uses) one or more virtual disks that are created and presented by the array controller.
<b>job</b>	A repeatable custom script that automates replication tasks. A job can be simple (for example, create a DR group) or complex (for example, perform cascaded replication). Jobs can be run from the GUI, from the command line, from batch files, or by a scheduler.
<b>management server</b>	A server where HP StorageWorks Enterprise Virtual Array (EVA) management software is installed, including HP Command View EVA and HP Replication Solutions Manager, if used. A dedicated management server runs EVA management software exclusively. Other management servers are general purpose servers, HP ProLiant Storage Server (NAS) models, and the Storage Management Appliance. When there are multiple management servers in a SAN, two active instances of HP Command View EVA are allowed, but each array will only be managed by one instance. The active management server actively manages the array, while the standby management server takes control of the array if there is a failure on the active management server. There is only one active management server at a time for any given management zone in a SAN.
<b>Storage Management Appliance (SMA)</b>	HP OpenView Storage Management Appliance, an HP hardware-software product designed to run SAN management applications such as HP Command View EVA and HP Replication Solutions Manager.
<b>storage system</b>	Synonymous with virtual array. The HP Enterprise Virtual Array consists of one or more storage systems. See also virtual array.

<b>Universal Naming Convention (UNC)</b>	Referenced in many Edit panels of verbs in the Jobs Creation Interface.
<b>virtual array</b>	Synonymous with disk array and storage system, a group of disks in one or more disk enclosures combined with control software that presents disk storage capacity as one or more virtual disks. See also virtual disk.
<b>virtual disk</b>	Variable disk capacity that is defined and managed by the array controller and presentable to hosts as a disk.

# Index

## Symbols

Storage Area Manager  
deploying replication manager host agents, 14, 35  
starting replication manager, 18

## A

aborting replication manager server installation causes, 13  
adding remote access IP addresses, 20  
audience, 7  
authorized reseller  
    HP, 9  
avoiding configuration changes while jobs are running, 31  
avoiding network identification changes, 31  
avoiding simultaneous replication events for the same virtual disk, 32

## B

best practices, 31  
    avoiding configuration changes while jobs are running, 31  
    avoiding network identification changes, 31  
    avoiding simultaneous replication events for the same virtual disk, 32  
backing up replication jobs and configurations, 31  
coordinating replication server shutdowns, 31  
maintaining network connections, 31  
managing replication events, 32  
minimizing simultaneous replication events on an array, 32  
optimizing browser-based GUI performance, 32  
optimizing discovery performance, 32  
optimizing discovery refresh intervals, 32  
optimizing the number of active enabled hosts, 32  
scheduling jobs, 32  
snapclone rules, 33  
snapshot rules, 32  
using log files for troubleshooting, 32  
Windows caching, 33

## C

caching  
    Windows, 33  
changing replication manager login password, 19  
codes  
    event, 25  
concepts  
    DR group, 23  
    snapclone, 23

snapshot, 23  
configuring Windows systems with multiple NICs, 21  
conventions  
    document, 8  
    text symbols, 8  
coordinating replication server shutdowns, 31

## D

data replication group, 23  
database:  
    ; migrating, 26  
default replication manager installation directory, 13  
deploying replication manager host agents, 14, 35, 35  
document  
    conventions, 8  
    knowledge prerequisites, 7  
DR group  
    description, 23

## E

event  
    codes, 25  
    logs, 24  
    monitoring, 25

## G

general purpose server  
    starting replication manager, 18  
group data  
    importing, 28

## H

help  
    obtaining, 8  
HP  
    authorized reseller, 9  
    resource web sites, 9  
    storage web site, 9  
    technical support, 8  
HP Replication Solutions Manager interface  
    monitoring, 25  
HP-UX time-outs and delays, 43

## I

importing  
    group data, 28  
    user accounts, 28  
installation

replication manager requirements, 11  
installing  
  JREserver, 21  
  other applications in a replication manager environment, 17  
  replication manager server software, 13  
  replication manager software, 11  
  replication manager, host agent, GUI method, 13  
  replication manager, host agent, manually, 14  
  replication manager, server, GUI method, 13  
IP address  
  changing on UNIX systems, 20

**J**  
jobs, 29  
  minimizing simultaneous, 31  
  scheduling, 32

**L**  
logs  
  event, 24  
  security, 24  
  trace, 24  
  transaction, 24  
long delays on HP-UX, 43  
LUN  
  read-only access for destination, 43

**M**  
maintaining network connections, 31  
managed set, 23  
management server  
  changing password, 27  
managing replication events, 32  
migrating database, 26  
minimizing simultaneous replication events on an array, 32  
multiple NICs  
  configuring Windows systems, 21

**O**  
optimizing browser-based GUI performance, 32  
optimizing discovery performance, 32  
optimizing discovery refresh intervals, 32  
optimizing the number of active enabled hosts, 32

**P**  
password  
  changing, management server, 27  
post replication manager installation tasks  
  installing JREserver, 21  
  adding remote access IP addresses, 20  
  changing replication manager login password, 19  
prerequisites  
  knowledge, 7

replication manager, 11  
procedures  
  post replication manager installation tasks, changing  
  replication manager login password, 19  
  deploying replication manager host agents, 35  
  installing replication manager server, 13  
  installing, replication manager, host agent, 14  
  post replication manager installation tasks, adding  
  remote access IP addresses, 20  
  post replication manager installation tasks, installing  
  JREserver, 21  
  removing, replication manager, host agent, deployed  
  agents, 37  
  removing, replication manager, host agent, manual  
  installations, 40  
  removing, replication manager, host agent: manual  
  installations, Windows host, 40  
  removing, replication manager, server, 39  
  starting replication manager, applet mode via  
  browsing, 18

**R**  
read-only access  
  destination LUN, 43  
remote access IP addresses  
  adding, 20  
removal requirements  
  replication manager server, 39  
removing  
  replication manager, host agent, deployed agents,  
  37  
  replication manager, host agent, manual installations,  
  40  
  replication manager, host agent, manual installations,  
  Windows host, 40  
  replication manager, server, 39  
replication manager  
  default installation directory, 13  
  host agent, installing, manually, 14  
  host agent, removing, deployed agents, 37  
  host agent: installing, GUI method, 13  
  host agent: manual installations, Windows hosts, 40  
  installation requirements, 11  
  installing, 11  
  installing, other applications, 17  
  login password, changing, 19  
  monitoring events, 25  
  post-installation tasks, changing replication manager  
  loginpassword, 19  
  post-installation tasks, installing JREserver, 21  
  server, aborted installation causes, 13  
  server, installing, 13  
  server, installing, GUI method, 13  
  server, removal requirements, 39  
  server, software removal, 39  
  troubleshooting installation or removal, 41  
Replication Solutions Manager interface  
  managed sets, 23  
  recommended uses, 24

replication tasks, 23

## S

security logs, 24

setting read-only access for a destination LUN, 43

SMA

  starting replication manager, 18

snapshotclone

  concept, 23

  rules, 33

snapshot

  concept, 23

  rules, 32

software

  installing, 11

starting replication manager, 18

  applet mode via browsing, 18

symbols in text, 8

## T

technical support

  HP, 8

text symbols, 8

time-outs on HP-UX, 43

trace logs, 24

transaction logs, 24

troubleshooting

  IP address on UNIX, 20

  long delays or time-outs on HP-UX, 43

  LUN detection, 43

  tunnel thrash, 43

troubleshooting replication manager installation or removal, 41

tunnel thrash

  troubleshooting, 43

## U

UNIX systems

  changing IP address of local host, 20

user accounts

  importing, 28

using log files for troubleshooting, 32

## W

web sites

  HP resources, 9

  HP storage, 9

  HP Subscriber's choice, 9

  HP technical support, 8

Windows caching, 33

Windows clusters

  configuring systems with multiple NICs, 21